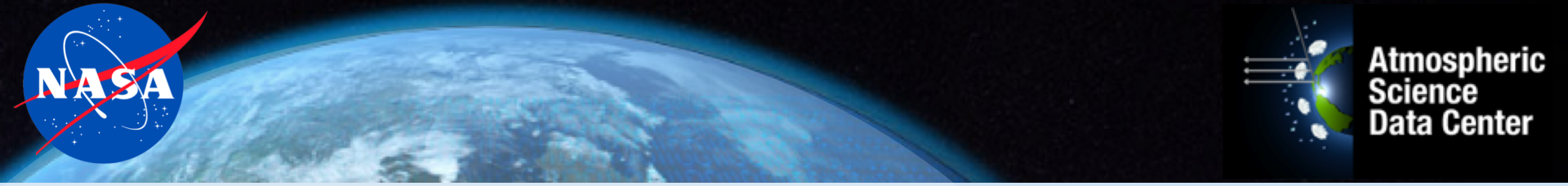
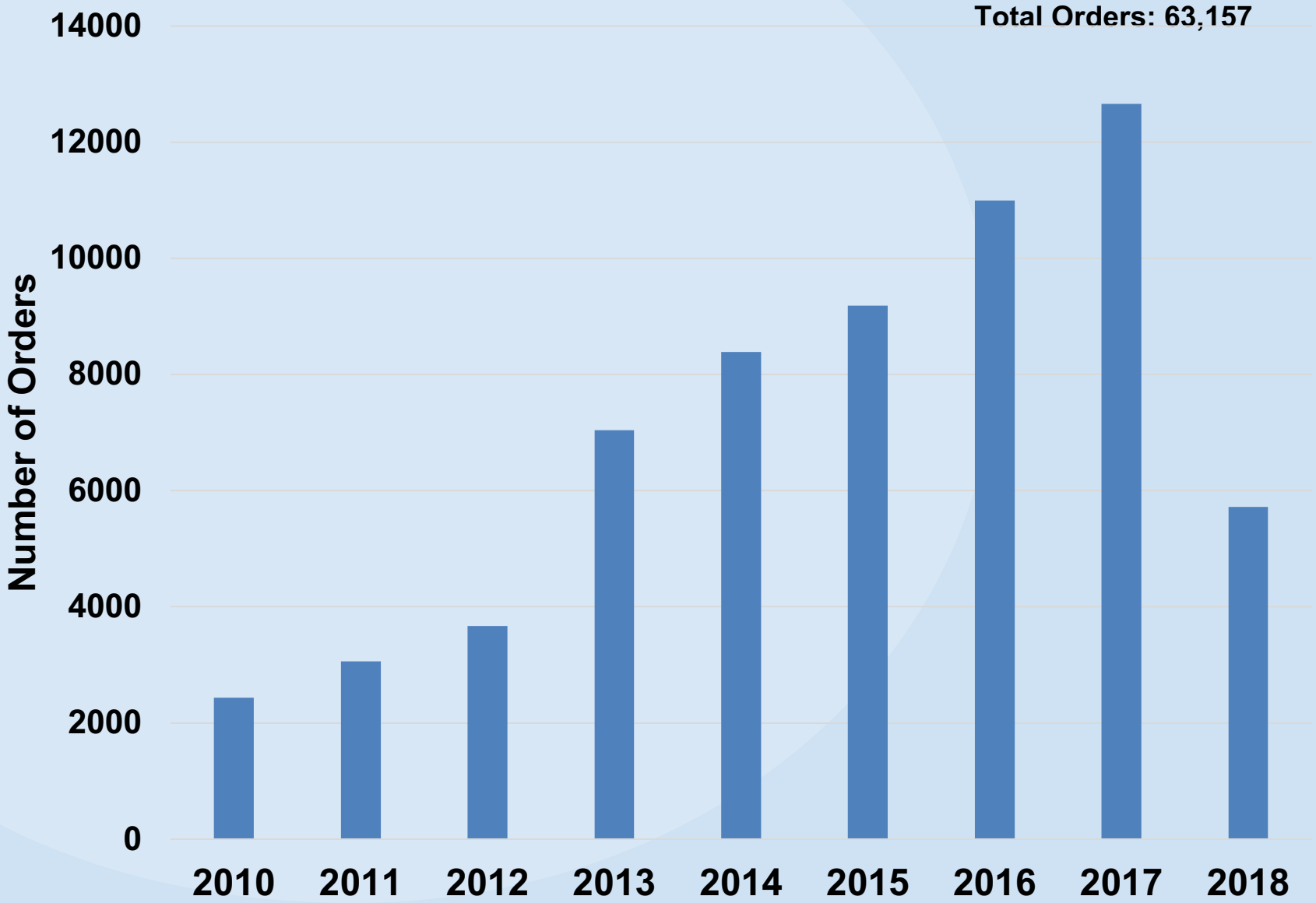


CERES Science Team Meeting

Atmospheric Science Data Center
May 15, 2018

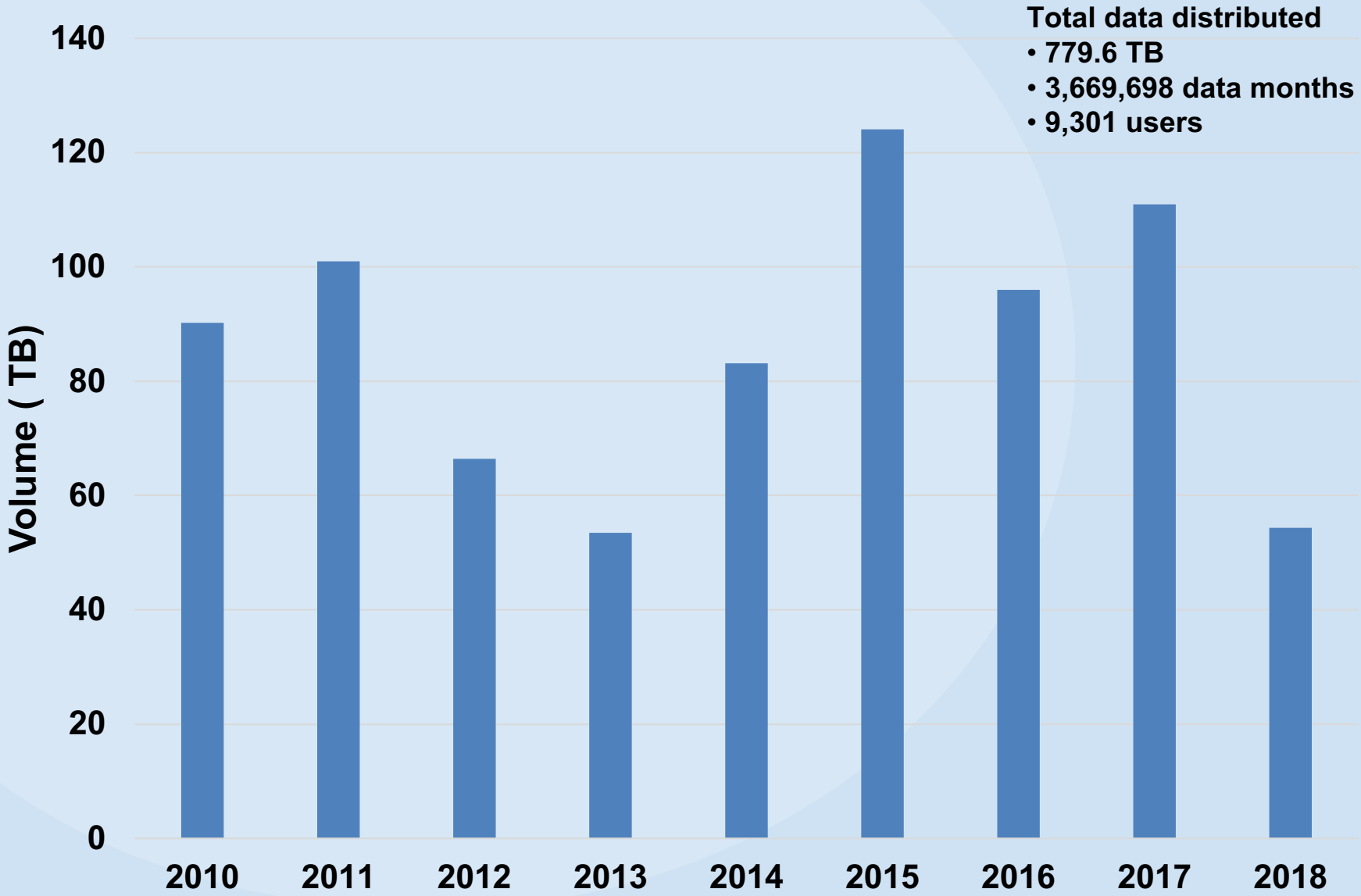
CERES Data Orders
(June 2010 – April 2018)

Atmospheric Science Data Center



CERES Data Distribution
(June 2010 – April 2018)

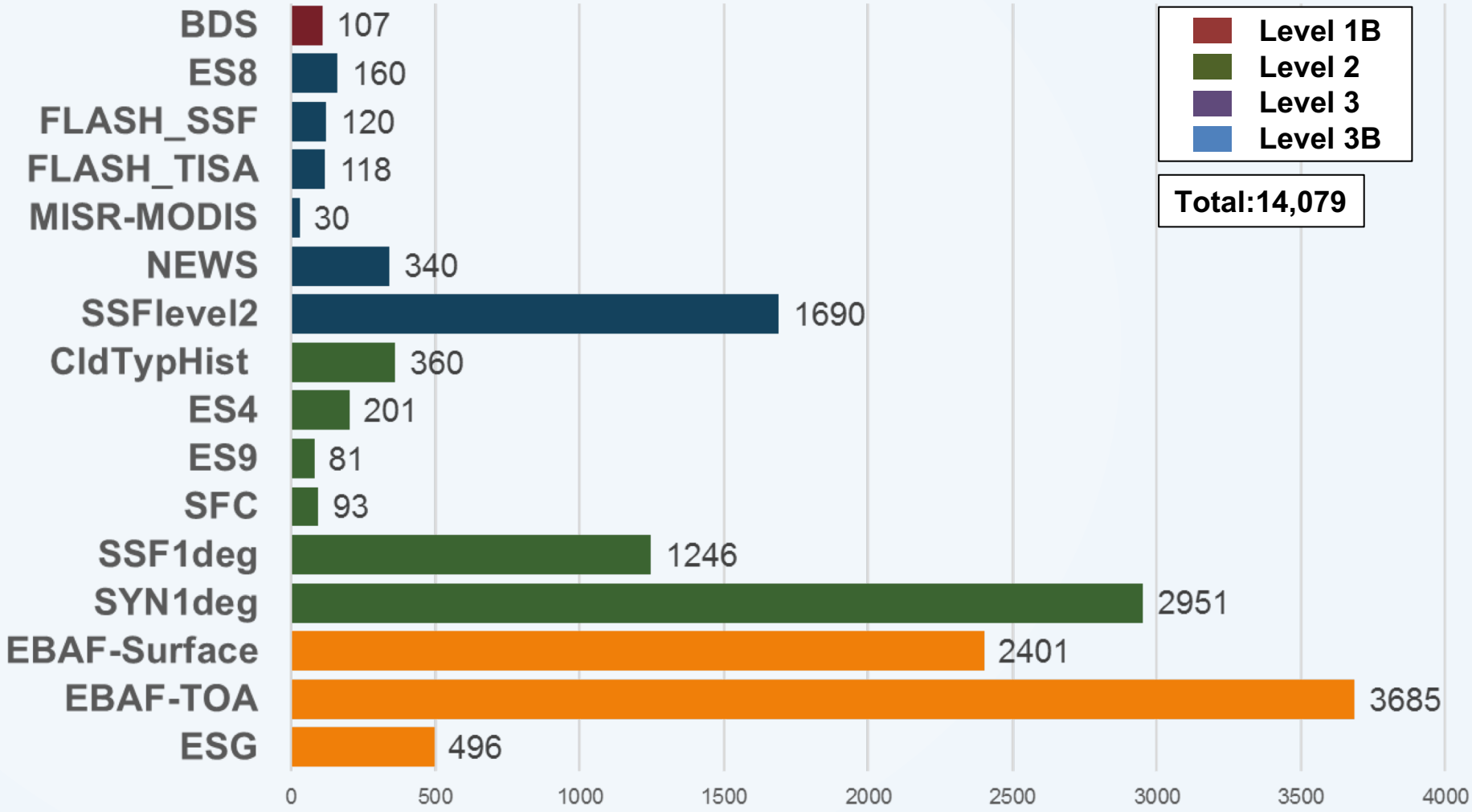
Atmospheric Science Data Center



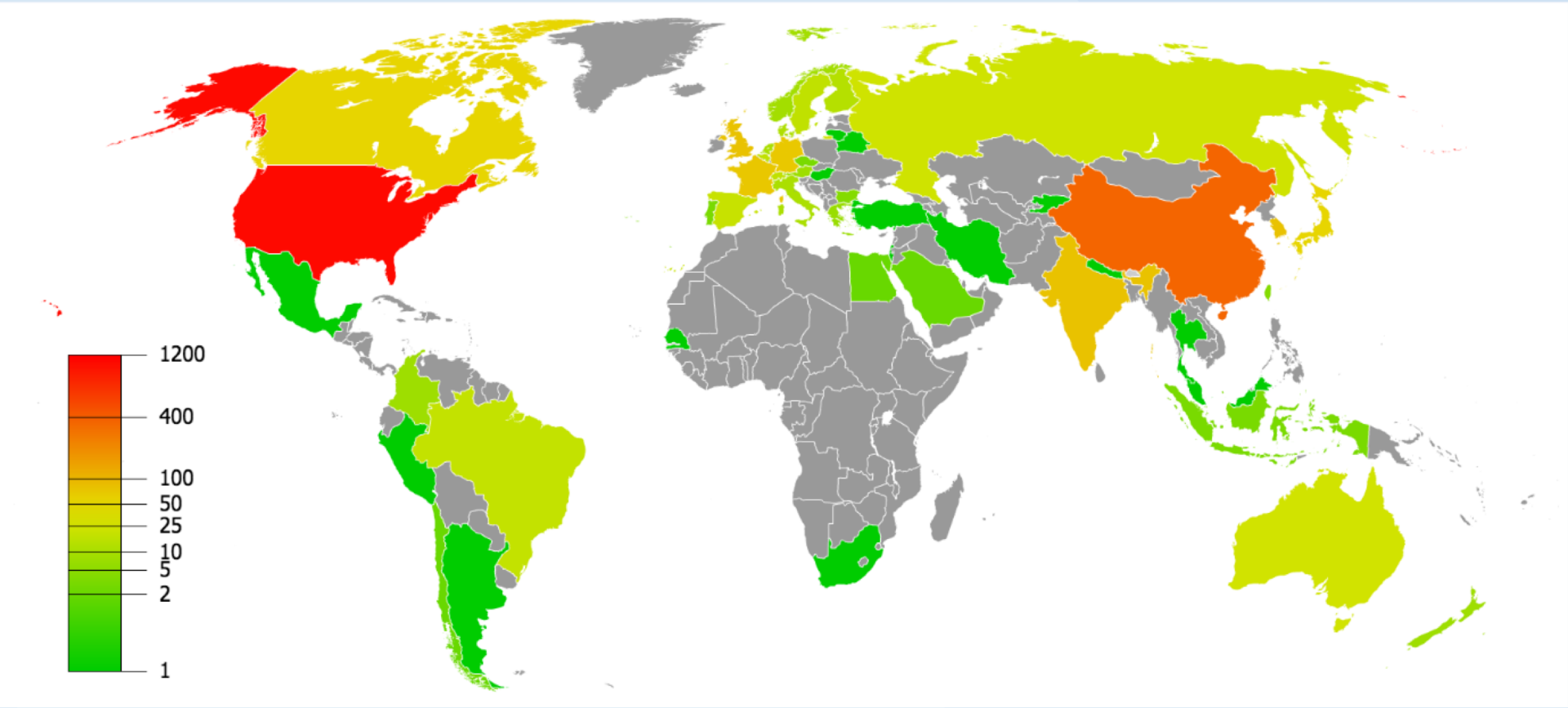
Number of Users by Product

(June 2010 – April 2018)

Atmospheric Science Data Center



Users by Country
(June 2010 – April 2018)



ASDC Staffing
2017

Category	Terra/Aqua	SNPP
IT Security	0.2	0.1
User Services	1	0.92
Operations	4	0.35
Engineering	0.25	0.25
Infrastructure	0.2	1.32
Mission Support	3.5	0.5
Administration	0.25	0.01
Total	**9.4**	**3.44**

ASDC Staffing
2018

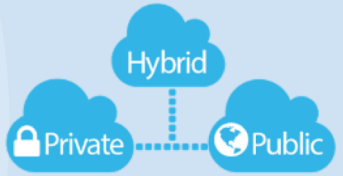
Atmospheric Science Data Center

Category	Terra/Aqua	SNPP
IT Security	0.2	0.1
User Services	1	0.5
Operations	2.5	0.25
Engineering	0.25	0.25
Infrastructure	0.2	0.4
Mission Support	2.0	0.5
Administration	0.25	0.1
Total	**5.4**	**2.1**

ASDC Cloud Vision & Strategy

- Vision: Serve as a full-service cloud broker for NASA LaRC Science Directorate (SD), LaRC Distributed Active Archive Center (DAAC), and LaRC Science Investigator-Led Processing Systems (SIPS)

What is the ASDC Cloud?



- Highly configurable, on-premise private cloud environment
- *[Future]* Integrated broker to access public cloud service providers
- Deliberate strategy for long-term data center optimization and customer service
- Forward-thinking approach with cloud operating model for holistic cloud management
- Full-service catalog of support, onboarding, and professional services to ensure differentiated offerings for customers with a wide range of requirements

ASDC Cloud Service Benefits (1 of 2)

IT Efficiencies

- Long-term ASDC data center optimization
- Increased uniformity regarding development, operations, and management of resources
- Quickly provision processing, storage, and networking resources
- Rapidly deploy application stack without burden of managing the underlying infrastructure

Potential for Enhanced Performance (with proper optimization)

- Operational agility and scalability for increased efficiency
- Potential for superior performance for latency-sensitive and data processing applications (with the proper optimization)
- Elasticity to automatically adjust compute resources during times of high demand
- Enhanced fault-tolerance and resiliency of individual components

ASDC Cloud Service Benefits (2 of 2)

Increased Security and Control Over Local Data

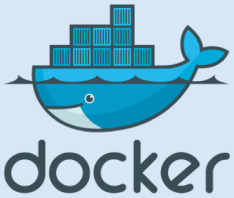
- Access over private networks and control over infrastructure
- Applications inherit security already in place for the platform
- Data sets remain local for continued control
- Co-location of data with processing resources minimizes the cost risk for certain applications
- Centralized management of enterprise compute resources

Knowledgeable & Dedicated Mission Partner

- Full-service cloud broker offering professional services by experienced cloud engineers
- Staff knowledgeable about NASA and Science Community missions and challenges
- Dedicated to your success
- Enable ability to take advantage of benefits offered by both private and public cloud services

What is OpenShift

- Open Source PaaS
  - RH enterprise
- Kubernetes + Docker + DevOps tools
  - Containers
  - Container Orchestration
  - Automated build tools, CI/CD tools
  - Self-service



kubernetes

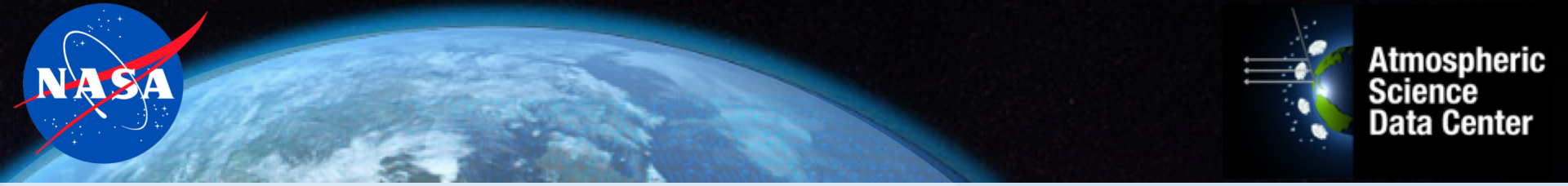
DMZ-C Infrastructure Services

- Database Support
  - mysql 5.7, postgresql 9.6
- Monitoring & Log Collation
  - nagios, splunk
- Storage
  - EMC Isilon, GPFS, Gluster
- Backups
  - Bacula & HPSS
- Orchestration
  - RedHat CloudForms, Ansible

Cloud Infrastructure Update

- Internal OpenShift PaaS (dev/test/internal prod)
  - **In production**
- DMZ OpenShift PaaS (external prod)
  - **In production**
- DMZ Ceph Object Store
  - In burn-in phase
- DMZ OpenStack IaaS
  - In burn-in phase

Atmospheric Science Data Center
NASA Langley Research Center
Hampton, VA



Future Iterations

- Additional Infrastructure Node
- Automated CI/CD Pipelines
- Training / Plenaries
- Capacity monitoring & planning
- Scale-out clusters utilizing IaaS

Process & Governance

- Based on updates to the environment, updated the following to accurately reflect our current PaaS solution offering

- ASDC Cloud Service Documentation:
  - ASDC Cloud Service Catalog & Quick Reference
  - ASDC Cloud Service Agreement Template (for external)
  - ASDC Cloud Service Pipeline (new)

- ASDC Cloud Onboarding Framework:
  - Cloud Onboarding Request Process (Int & Ext) for a consistent user experience
  - ASDC Cloud Service Desk (onboarding and support requests)
  - ASDC Cloud Knowledge Base
  - ASDC Cloud 101 / Getting Started Guide (starting point)

- Clarity, Consistency, User Empowerment, Customer Satisfaction, Reduction of Burden on Limited ASDC Resources